Zemo Partnership | **Zero Emission Bus Certification ID:** | **ZEB-NEW-POWER-STREETDECK-2024** | Approved Test facility UTAC

Zero Emission Bus Certificate

Customer:	**Bamford Bus Company ltd (trading as Newpower)**			**DYNAMOMETER SETTINGS**		
Customer Address:	**Unit 4 Axis J9, Empire Road, Bicester, OX26 2FL**	*Telematics Capability*	Yes	Test Weight	14782	kg
Test Purpose:	**Zero Emission Bus Testing (ZEVRAS)**	*Maximum Speed (km/h)*	80 km/h	F°	-37.95	N
Vehicle Manufacturer:	**Newpower**	*Seated Capacity*	69	F¹	-5.4263	N/kmh
Vehicle Model Name:	**StreetDeck Repower**	*Passenger Capacity*	84	F²	0.24497	N/kmh ²
Powertrain Technology	**Battery Electric**	*Declared Unladen Weight (kg)*	12454	*Equivalent test passengers*	34.5	passengers
Powetrain Configuration	**Direct Drive**	*Gross Weight (kg)*	18600	*Measured Unladen Weight*	12454	kg
Zero Emission Heating	**Heat Pump**	*GVW Check*	**OK**	Number of conseuitve tests completed	4	Tests

Battery Specification		**Charging and Refuelling Capability**		**Hydrogen Specification**	
Battery Manufacturer	**Forsee Power**	Plug Type	**CCS2**	Fuel Cell Manufacturer	**N/A**
Battery Chemistry	**NMC**	Max Charge Capability (kW)	**Up to 150kW**	Fuel Cell Power Rating (kW)	**N/A**
Battery Installed Capacity (kWh)	**385**	Charger Compatibility	**DC**	Hydrogen Storage Capacity (kg)	**N/A**
Battery Usable Capacity (kWh)*	**308**	Charge time from 20-80% SOC**	**1-2 hours**	Hydrogen Storage Pressure (bar)	**N/A**

* Recommended manufacturer guideline, subject to warranty ** Based on manufacturer estimate

Declared fuel, properties and source plus carbon conversion factors

Well-to-Tank Factor:	***Electricity***	**72.65**	**g CO_2e / MJ**	*Fuel Provider*	**UK market standard**	*WTT evidence*	**DBEIS Conversion 2022**
Well-to-Tank Factor:	***Hydrogen***	**N/A**	**g CO_2e / MJ**	*Capacity of Tanker (kg)*	**N/A**	*Fuel Type / Pathway*	**UK Grid Electricity**
Energy Density	***Hydrogen***	**N/A**	**MJ / kg**	*Transport Distance of Hydrogen (km)*	**N/A**	*Energy Source*	**UK Grid**

Emissions and Energy consumption results from approved test facility - Average 4 tests

Test Phase	HC (g/km)	CO (g/km)	NOx (g/km)	PM (g/km)	CO_2 (g/km)	CH_4 (g/km)*	N_2O (g/km)*	Total Energy Consumption (kWh)	Vehicle Energy Consumption (kWh/km)	Grid Electrical Energy Consumption (kWh/ 100km)
Outer Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.68	0.87	95.20
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.08	1.20	132.26
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.38	0.72	79.35
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.76	0.96	105.60
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14.14	0.85	**93.80**

Zero Emissions (Z.E.) Range: Energy consumption and charging efficiency

Test Charger Used	**40kW**	**Total measured energy consumed on vehicle (kWh)[1]**	**64.30**	**Max ZE Range at 100% SOC (km)**	**361**
Hydrogen Energy Over Test (kWh)	**N/A**	**Measured grid energy during charging (kWh)**	**70.70**	**Max ZE Range at 80% SOC (km)**	**289**
Hydrogen Delivered to Vehicle (kg)	**N/A**	**Grid-to-Wheel efficiency (%)[2]**	**91%**	**Test Distance Travelled (km)**	**73**

[1] Total measured energy may include energy used during the 23 minute warmup, this is needed for charge efficiency calculation.

[2] Grid to Wheel efficiency represents the total energy losses between the grid and the wheels of the bus.

Calculated total Well-to-Wheel GHG CO_2 equivalent emissions over test

Test Phase	Fuel Energy (MJ /km)	Fuel WTT*GHG Emissions (g CO_2e / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO_2e / km)
Outer Urban	N/A	N/A	3.43	249.00
Inner Urban	N/A	N/A	4.76	345.91
Rural	N/A	N/A	2.86	207.53
LBC Average	N/A	N/A	3.80	276.19
UK BUS Average	N/A	N/A	3.38	245.33

Data Generated by (On behalf of Test facility): L. Coleman — *Date:* 10/10/2024

Data Approved by: — *Date:* 10/10/2024

Zero Emission Bus Certificate Summary

Test Vehicle			*Average Euro VI Diesel Equivalent*		
Greenhouse Gas Emissions: Well-to-Wheel	**245.3**	**g CO_2e / km**	**Average Diesel GHG Emissions Equivalent**	**1271**	**g CO_2e / km**
WTW CO_2 per passenger km (@ Max Pass Capacity)	**2.9**	**g CO_2e/pass km**	**WTW CO_2 per passenger km (@ Max Pass Capacity)**	**15.1**	**g CO_2e/pass km**

Overall Zero Emission Bus Performance

WTW GHG saving	**1026.0**	**g CO_2e / km**	**Maximum Theoretical Zero Emission Range (km)**	**360.6**
% WTW GHG saving	**81%**	**g CO_2e / km**	**Vehicle Energy Consumption (kWh/ km)**	**0.85**
Approved as Zero Emission Bus? (50% GHG saving or more)			***YES***	

**** WTT : Well-to-Tank*** ***** TTW : Tank-to-Wheel*** ****** WTW : Well-to Wheel***

COMMENTS:
Interior lights would not turn on until 1370 secs into 1st UKBC Cycle.
Outer London Warmup Carried out prior to 1st UKBC.

Heating Requirement	**Cell**	**Lower Saloon**	**Upper Saloon**
Target Temperatures ±2 (°C) :	**10**	**17**	**17**
Average Temperatures across testing (°C)	10.00	17.76	15.84

Test Numbers: 20241008_1529_2xUKBC, 20241008_1739_2xUKBC

Certificate approved by:
On behalf of Bus manufacturer
Connor Spence
Homologation Manager - International

Certificate Approved by:
On behalf of DfT / Zemo Partnership
Project Manager